

What is claimed is:

1. A method of cementing in a subterranean formation penetrated by a well bore comprising the steps of:

    placing a cement composition into the well bore, wherein the cement composition comprises a first cementitious component having a first set time and a second cementitious component having a set second set time that is delayed relative to the first set time of the first cementitious component;

    allowing the first cementitious component to at least partially set; and

    allowing the second cementitious component to set after a delay period.

2. The method of claim 1 wherein at least one void forms during the setting of the first cementitious component.

3. The method of claim 2 wherein at least one void is due to at least the use of an expandable tubular.

4. The method of claim 2 wherein second cementitious component sets so as to cure at least one void that forms during the setting of the first cementitious component.

5. The method of claim 1 wherein the second cementitious component will not begin to hydrate until after the delay period.

6. The method of claim 1 wherein the first cementitious component comprises a Portland cement, a pozzolanic cement, a gypsum cement, a high alumina content cement, a silica cement, a soil cement, a calcium phosphate cement, a high alkalinity cement, or mixtures thereof.

7. The method of claim 1 wherein the second cementitious component comprises microencapsulated cement particles.

8. The method of claim 7 wherein the microencapsulated cement particles comprise a Portland cement, a pozzolanic cement, a gypsum cement, a high alumina content cement, a silica cement, a soil cement, a calcium phosphate cement, a high alkalinity cement, or mixtures thereof.

9. The method of claim 7 wherein the microencapsulated cement particles comprise an expansive hydraulic cement.

10. The method of claim 7 wherein the microencapsulated cement particles comprise an ultra-fine particle size cement having particle size diameters not greater than about 30 microns.

11. The method of claim 7 wherein the microencapsulated cement particles comprise conventional particle size cement, fine particle size cement, ultra-fine particle size cement, or mixtures thereof.

12. The method of claim 7 wherein the microencapsulated cement particles are released into the cement composition after the delay period.

13. The method of claim 7 wherein the encapsulation of the second cementitious component involves at least one coating of a degradable material.

14. The method of claim 13 wherein the coating should not substantially degrade for at least six hours.

15. The method of claim 13 wherein the degradable material prevents incorporation of the microencapsulated cement particles into the cement composition until after the delay period.

16. The method of claim 13 wherein the degradable material is a degradable polymeric material.

17. The method of claim 13 wherein the degradable material comprises dextran, cellulose, a chitin, a chitosan, a liquid ester, a protein, an aliphatic polyester, a poly(lactide), a poly(glycolide), a poly( $\epsilon$ -caprolactone), a poly(hydroxybutyrate), a poly(anhydride), an aliphatic polycarbonate, an ortho ester, a poly(orthoesters), a poly(amino acid), a poly(ethylene oxide), or a polyphosphazene.

18. The method of claim 1 wherein the second cementitious component is present in the cement composition in a first cementitious component-to-second cementitious component weight ratio in the range of from about 50:50 to about 90:10.

19. The method of claim 1 wherein the cement composition further comprises an expanding additive that is microencapsulated in a coating of a degradable material.

20. The method of claim 19 further comprising the step of combining the expanding additive and second cementitious component prior to microencapsulation thereby allowing for the simultaneous microencapsulation of the expanding additive and the second cementitious component.

21. The method of claim 19 wherein the expanding additive comprises an aluminum powder, a gypsum blend, or a deadburned magnesium oxide.

22. The method of claim 1 wherein the cement composition further comprises fly ash, a silica compound, a fluid loss control additive, a surfactant, a dispersant, an accelerator, a

retarder, salt, mica, fiber, a formation conditioning agent, bentonite, microspheres, a weighting material, or a defoamer.

23. A method of cementing in a subterranean formation penetrated by a well bore comprising the steps of:

placing a cement composition into the well bore, wherein the cement composition comprises a first cementitious component having a first set time and a second cementitious component comprising microencapsulated cement particles, wherein the second cementitious component has a second set time that is delayed relative to the first set time of the first cementitious component;

allowing the first cementitious component to at least partially set having at least one void; and

allowing the second cementitious component to set after a delay period so as to cure at least one void that forms during the setting of the first cementitious component.

24. The method of claim 23 wherein at least one void is due to at least the use of an expandable tubular.

25. The method of claim 23 wherein the second cementitious component will not begin to hydrate until after the delay period.

26. The method of claim 23 wherein the first cementitious component comprises a Portland cement, a pozzolanic cement, a gypsum cement, a high alumina content cement, a silica cement, a soil cement, a calcium phosphate cement, a high alkalinity cement, or mixtures thereof.

27. The method of claim 23 wherein the microencapsulated cement particles comprise a Portland cement, a pozzolanic cement, a gypsum cement, a high alumina content cement, a silica cement, a soil cement, a calcium phosphate cement, a high alkalinity cement, or mixtures thereof.

28. The method of claim 23 wherein the microencapsulated cement particles comprise an expansive hydraulic cement.

29. The method of claim 23 wherein the microencapsulated cement particles comprise an ultra-fine particle size cement having particle size diameters not greater than about 30 microns.

30. The method of claim 23 wherein the microencapsulated cement particles comprise conventional particle size cement, fine particle size cement, ultra-fine particle size cement, or mixtures thereof.

31. The method of claim 23 wherein the microencapsulated cement particles are released into the cement composition after the delay period.

32. The method of claim 23 wherein the encapsulation of the second cementitious component involves at least one coating of a degradable material.

33. The method of claim 32 wherein the coating should not substantially degrade for at least six hours.

34. The method of claim 32 wherein the degradable material prevents incorporation of the microencapsulated cement particles into the cement composition until after the delay period.

35. The method of claim 32 wherein the degradable material is a degradable polymeric material.

36. The method of claim 32 wherein the degradable material comprises dextran, cellulose, a chitin, a chitosan, a liquid ester, a protein, an aliphatic polyester, a poly(lactide), a poly(glycolide), a poly( $\epsilon$ -caprolactone), a poly(hydroxybutyrate), a poly(anhydride), an aliphatic polycarbonate, an ortho ester, a poly(orthoesters), a poly(amino acid), a poly(ethylene oxide), or a polyphosphazene.

37. The method of claim 23 wherein the second cementitious component is present in the cement composition in a first cementitious component-to-second cementitious component weight ratio in the range of from about 50:50 to about 90:10.

38. The method of claim 23 wherein the cement composition further comprises an expanding additive that is microencapsulated in a coating of a degradable material.

39. The method of claim 38 further comprising the step of combining the expanding additive and second cementitious component prior to microencapsulation thereby allowing for the simultaneous microencapsulation of the expanding additive and the second cementitious component.

40. The method of claim 38 wherein the expanding additive comprises an aluminum powder, a gypsum blend, or a deadburned magnesium oxide.

41. A method of cementing an expandable tubular in a subterranean formation penetrated by a well bore comprising the steps of:

placing the expandable tubular into the well bore;

placing a cement composition into the well bore wherein the cement composition comprises a first cementitious component having a first set time and a second cementitious component having a second set time that is delayed relative to the first set time of the first cementitious component;

allowing the first cementitious component to at least partially set;

expanding the expandable tubular; and

allowing the second cementitious component to set after a delay period.

42. The method of claim 41 wherein at least one void forms during setting of the first cementitious component.

43. The method of claim 42 wherein second cementitious component sets so as to cure at least one void that forms during the setting of the first cementitious component.

44. The method of claim 41 wherein the second cementitious component will not begin to hydrate until after the delay period.

45. The method of claim 41 wherein the first cementitious component comprises a Portland cement, a pozzolanic cement, a gypsum cement, a high alumina content cement, a silica cement, a soil cement, a calcium phosphate cement, a high alkalinity cement, or mixtures thereof.

46. The method of claim 41 wherein the second cementitious component comprises microencapsulated cement particles.

47. The method of claim 46 wherein the microencapsulated cement particles comprise a Portland cement, a pozzolanic cement, a gypsum cement, a high alumina content cement, a silica cement, a soil cement, a calcium phosphate cement, a high alkalinity cement, or mixtures thereof.

48. The method of claim 46 wherein the microencapsulated cement particles comprise an expansive hydraulic cement.

49. The method of claim 46 wherein the microencapsulated cement particles comprise an ultra-fine particle size cement having particle size diameters not greater than about 30 microns.

50. The method of claim 46 wherein the microencapsulated cement particles comprise conventional particle size cement, fine particle size cement, ultra-fine particle size cement, or mixtures thereof.

51. The method of claim 46 wherein the microencapsulated cement particles are released into the cement composition after the delay period.

52. The method of claim 46 wherein the encapsulation of the second cementitious component involves at least one coating of a degradable material.

53. The method of claim 52 wherein the coating should not substantially degrade for at least six hours.

54. The method of claim 52 wherein the degradable material prevents incorporation of the microencapsulated cement particles into the cement composition until after the delay period.

55. The method of claim 52 wherein the degradable material is a degradable polymeric material.

56. The method of claim 52 wherein the degradable material comprises dextran, cellulose, a chitin, a chitosan, a liquid ester, a protein, an aliphatic polyester, a poly(lactide), a poly(glycolide), a poly( $\epsilon$ -caprolactone), a poly(hydroxybutyrate), a poly(anhydride), an aliphatic polycarbonate, an ortho ester, a poly(orthoesters), a poly(amino acid), a poly(ethylene oxide), or a polyphosphazene.

57. The method of claim 41 wherein the second cementitious component is present in the cement composition in a first cementitious component-to-second cementitious component weight ratio in the range of from about 50:50 to about 90:10.

58. The method of claim 41 wherein the cement composition further comprises an expanding additive that is microencapsulated in a coating of a degradable material.

59. The method of claim 58 further comprising the step of combining the expanding additive and second cementitious component prior to microencapsulation thereby allowing for the simultaneous microencapsulation of the expanding additive and the second cementitious component.

60. The method of claim 58 wherein the expanding additive comprises an aluminum powder, a gypsum blend, or a deadburned magnesium oxide.

61. The method of claim 41 wherein the cement composition further comprises fly ash, a silica compound, a fluid loss control additive, a surfactant, a dispersant, an accelerator, a

retarder, salt, mica, fiber, a formation conditioning agent, bentonite, microspheres, a weighting material, or a defoamer.

62. A method of cementing an expandable tubular in a subterranean formation penetrated by a well bore comprising the steps of:

placing the expandable tubular into the well bore;

placing a cement composition into the well bore wherein the cement composition comprises a first cementitious component having a first set time and a second cementitious component comprising microencapsulated cement particles, wherein the second cementitious component has a second set time that is delayed relative to the first set time of the first cementitious component;

allowing the first cementitious component to at least partially set having at least one void;

expanding the expandable tubular; and

allowing the second cementitious component to set after a delay period so as to cure at least one void that forms during the setting of the first cementitious component.

63. The method of claim 62 wherein the second cementitious component will not begin to hydrate until after the delay period.

64. The method of claim 62 wherein the first cementitious component a Portland cement, a pozzolanic cement, a gypsum cement, a high alumina content cement, a silica cement, a soil cement, a calcium phosphate cement, a high alkalinity cement, or mixtures thereof.

65. The method of claim 62 wherein the microencapsulated cement particles a Portland cement, a pozzolanic cement, a gypsum cement, a high alumina content cement, a silica cement, a soil cement, a calcium phosphate cement, a high alkalinity cement, or mixtures thereof.

66. The method of claim 62 wherein the microencapsulated cement particles comprise an expansive hydraulic cement.

67. The method of claim 62 wherein the microencapsulated cement particles comprise an ultra-fine particle size cement having particle size diameters not greater than about 30 microns.

68. The method of claim 62 wherein the microencapsulated cement particles comprise conventional particle size cement, fine particle size cement, ultra-fine particle size cement, or mixtures thereof.

69. The method of claim 62 wherein the microencapsulated cement particles are released into the cement composition after the delay period.

70. The method of claim 62 wherein the encapsulation of the second cementitious component involves at least one coating of a degradable material.

71. The method of claim 70 wherein the coating should not substantially degrade for at least six hours.

72. The method of claim 70 wherein the degradable material prevents incorporation of the microencapsulated cement particles into the cement composition until after the delay period.

73. The method of claim 70 wherein the degradable material is a degradable polymeric material.

74. The method of claim 73 wherein the degradable material comprises dextran, cellulose, a chitin, a chitosan, a liquid ester, a protein, an aliphatic polyester, a poly(lactide), a poly(glycolide), a poly( $\epsilon$ -caprolactone), a poly(hydroxybutyrate), a poly(anhydride), an aliphatic polycarbonate, an ortho ester, a poly(orthoesters), a poly(amino acid), a poly(ethylene oxide), or a polyphosphazene.

75. The method of claim 62 wherein the second cementitious component is present in the cement composition in a first cementitious component-to-second cementitious component weight ratio in the range of from about 50:50 to about 90:10.

76. The method of claim 62 wherein the cement composition further comprises an expanding additive that is microencapsulated in a coating of a degradable material.

77. The method of claim 76 further comprising the step of combining the expanding additive and second cementitious component prior to microencapsulation thereby allowing for the simultaneous microencapsulation of the expanding additive and the second cementitious component.

78. The method of claim 76 wherein the expanding additive comprises an aluminum powder, a gypsum blend, or a deadburned magnesium oxide.